

Home > [Progress in Pattern Recognition, Image Analysis, Computer Vision, and Applications](#) > Conference paper

# Towards a Robust Solution for the Supermarket Shelf Audit Problem: Obsolete Price Tags in Shelves

| Conference paper | First Online: 27 November 2023

| pp 257–271 | [Cite this conference paper](#)



**Progress in Pattern  
Recognition, Image Analysis,  
Computer Vision, and...**

(CIARP 2023)

[Emmanuel F. Morán](#) , [Boris X. Vintimilla](#) & [Miguel A. Realpe](#)

 Part of the book series: [Lecture Notes in Computer Science](#) ((LNCS, volume 14469))

 Included in the following conference series:  
[Iberoamerican Congress on Pattern Recognition](#)

 481 Accesses

## Abstract

Shelf auditing holds significant importance within the retail industry's industrial sector. It encompasses various processes carried out by human operators. This article aims to address the issue of identifying outdated price tags on shelves, bridging the gap of an automated shelf audit. Our proposal introduces a minimum viable process that effectively detects, recognizes, and locates price tags using computer vision and deep learning techniques. The outcomes of this study demonstrate the robustness of our approach in generating a comprehensive list of price tags on shelves, which can be subsequently compared with a database to identify and flag obsolete ones.

 This is a preview of subscription content, [log in via an institution](#)  to check access.

Access this chapter

Log in via an institution

 Chapter

USD 29.95

Price excludes VAT (Ecuador)

 eBook

USD 84.99

Available as PDF  
Read on any device  
Instant download  
Own it forever

[Buy Chapter →](#)
 Softcover Book

USD 109.99

Tax calculation will be finalised at checkout

Purchases are for personal use only

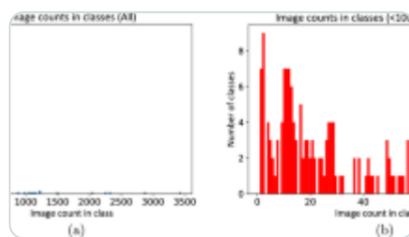
[Institutional subscriptions →](#)

## Similar content being viewed by others



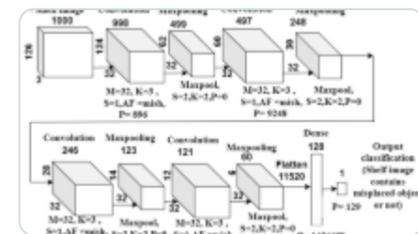
### Automatic Detection and Recognition of Products and Planogram Conformity Analysis in Real Time on Store Shelves

Chapter | © 2022



### Automated barcodeless product classifier for food retail self-checkout images

Article | 20 December 2023



### A deep learning and transfer learning model for intra-change detection in images

Article | 29 January 2024

## References

1. Moran, E., Vintimilla, B., Realpe, M.: Towards a robust solution for the supermarket shelf audit problem. In: Proceedings of the 18th International Joint Conference on Computer Vision, Imaging and Computer Graphics Theory and Applications - Volume 4: VISAPP, pp. 912–919, ISBN 978-989-758-634-7, ISSN 2184-4321 (2023)

[Google Scholar](#)

2. Menon, R.V., Sigurdsson, V., Larsen, N.M., Fagerstrøm, A., Foxall, G.R.: Consumer attention to price in social commerce: eye tracking patterns in retail clothing. *J. Bus. Res.* **69**(11), 5008–5013 (2016)

[Article](#) [Google Scholar](#)

3. Dutta, S., Bergen, M., Levy, D., Venable, R.: Menu costs, posted prices, and multiproduct retailers. *J. Money, Credit, Bank.* **31**(4), 683–703 (1999)

[Google Scholar](#)

4. Goldman, E., et al.: Precise Detection in Densely Packed Scenes. (2019). <https://doi.org/10.48550/ARXIV.1904.00853>
5. Rubab, S., Khan, M.M., Ali, N., et al.: Hybrid approach for shelf monitoring and planogram compliance (hyb-smpc) in retails using deep learning and computer vision (2022). <https://doi.org/10.1155/2022/4916818>
6. Wei, Y., Tran, S., Xu, S., Kang, B., Springer, M.: Deep learning for retail product recognition: challenges and techniques (2020). <https://doi.org/10.1155/2020/8875910>
7. Chen, F., et al.: Unitail: Detecting, reading, and matching in retail scene (2022). <https://doi.org/10.48550/ARXIV.2204.00298>
8. Marder, M., Harary, S., Ribak, A., Tzur, Y., Alpert, S., Tzadok, A.: Using image analytics to monitor retail store shelves. *IBM J. Res. Develop.* **59**(2/3), 3:1–3:11 (2015). <https://doi.org/10.1147/JRD.2015.2394513>
9. Yilmazer, R., Birant, D.: Shelf auditing based on image classification using semi-supervised deep learning to increase on-shelf availability in grocery stores. *Sensors* **21**, 327 (2021). <https://doi.org/10.3390/s21020327>  
[Article](#) [Google Scholar](#)
10. Katuk, N., Ku-Mahamud, K.R., Zakaria, N.H.: A review of the current trends and future directions of camera barcode reading. *J. Theor. Appl. Inform. Technol.* **97**(8), 2268–2288 (2019). ISSN 1992–8645  
[Google Scholar](#)
11. Bantahar, M.A., Al-Gailani, S.A., Salem, A.A.: An automatic light control system for camera barcode reader. Springer, Singapore (2022). [https://doi.org/10.1007/978-981-16-8129-5\\_25](https://doi.org/10.1007/978-981-16-8129-5_25)
12. Brylka, R., Schwanecke, U., Bierwirth, B.: Camera based barcode localization and decoding in real-world applications. In: 2020 International Conference on Omni-Layer Intelligent Systems (COINS) (2020). <https://doi.org/10.1109/coins49042.2020.9191416>
13. Jocher, G.: YOLOv5 by Ultralytics (Version 7.0) [Computer software] (2020). <https://doi.org/10.5281/zenodo.3908559>
14. Google Vision API. <https://www.cloud.google.com/vision/docs/apis?hl=es-419>
15. ROS Noetic. <https://www.wiki.ros.org/noetic>
16. ROS TF: Multi-coordinate frame Tracking over time. <https://www.wiki.ros.org/tf>

17. ROS AMCL: Probabilistic localization System. <https://www.wiki.ros.org/amcl>
18. DBSCAN: Density-Based Spatial Clustering of Applications with Noise. <http://www.scikit-learn.org/stable/modules/generated/sklearn.cluster.DBSCAN.html>
19. ROS AR\_TAG\_ALVAR: An open source AR tag tracking library. [https://www.wiki.ros.org/ar\\_track\\_alvar](https://www.wiki.ros.org/ar_track_alvar)
20. Rahmah, N., Sitanggang, I.S.: Determination of optimal epsilon (eps) value on DBSCAN algorithm to clustering data on peatland hotspots in Sumatra. IOP Conf. Ser.: Earth Environ. Sci. **31** 012012 (2016). <https://doi.org/10.1088/1755-1315/31/1/012012>
21. Rand Index Algorithm: Computes a similarity measure between two clusterings. [https://www.scikit-learn.org/stable/modules/generated/sklearn.metrics.rand\\_score.html](https://www.scikit-learn.org/stable/modules/generated/sklearn.metrics.rand_score.html)
22. Adjusted Rand Index Algorithm: Rand index adjusted for chance. [https://www.scikit-learn.org/stable/modules/generated/sklearn.metrics.adjusted\\_rand\\_score.html](https://www.scikit-learn.org/stable/modules/generated/sklearn.metrics.adjusted_rand_score.html)

## Acknowledgements

---

This work has been partially supported by the ESPOL-CIDIS-11-2022 project and Tiendas Industriales Asociadas Sociedad Anonima (TIA S.A.). The authors would like to acknowledge TIA S.A., a leading grocery retailer in Ecuador, for providing access to an incredible environment for research and testing.

## Author information

---

### Authors and Affiliations

ESPOL Polytechnic University, Escuela Superior Politecnica del Litoral, ESPOL, CIDIS. Campus Gustavo Galindo Km. 30.5 Vía Perimetral, P.O. Box 09-01-5863, Guayaquil, Ecuador

Emmanuel F. Morán, Boris X. Vintimilla & Miguel A. Realpe

### Corresponding author

Correspondence to [Emmanuel F. Morán](#).

## Editor information

---

### Editors and Affiliations

Polytechnic Institute of Coimbra, Coimbra Institute of Engineering, Coimbra, Portugal

Verónica Vasconcelos

Polytechnic Institute of Coimbra, Coimbra Institute of Engineering, Coimbra, Portugal

Inês Domingues

Polytechnic Institute of Coimbra, Coimbra Institute of Engineering, Coimbra, Portugal

Simão Paredes

# Rights and permissions

---

[Reprints and permissions](#)

## Copyright information

---

© 2024 Springer Nature Switzerland AG

## About this paper

---

### Cite this paper

F. Morán, E., X. Vintimilla, B., A. Realpe, M. (2024). Towards a Robust Solution for the Supermarket Shelf Audit Problem: Obsolete Price Tags in Shelves. In: Vasconcelos, V., Domingues, I., Paredes, S. (eds) Progress in Pattern Recognition, Image Analysis, Computer Vision, and Applications. CIARP 2023. Lecture Notes in Computer Science, vol 14469. Springer, Cham. [https://doi.org/10.1007/978-3-031-49018-7\\_19](https://doi.org/10.1007/978-3-031-49018-7_19)

[.RIS](#) [.ENW](#) [.BIB](#)

DOI	Published	Publisher Name
<a href="https://doi.org/10.1007/978-3-031-49018-7_19">https://doi.org/10.1007/978-3-031-49018-7_19</a>	27 November 2023	Springer, Cham
Print ISBN	Online ISBN	eBook Packages
978-3-031-49017-0	978-3-031-49018-7	<a href="#">Computer Science</a>
		<a href="#">Computer Science (R0)</a>

## Publish with us

---

[Policies and ethics](#) [↗](#)

## Societies and partnerships

---

[The International Association for Pattern Recognition](#) [↗](#)